1: Mol Plant Microbe Interact. 2000 Mar;13(3):316-24. Related Articles, Links

Effects of green fluorescent protein or beta-glucuronidase tagging on the accumulation and pathogenicity of a resistance-breaking Lettuce mosaic virus isolate in susceptible and resistant lettuce cultivars.

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The RNA genome of a resistance-breaking isolate of Lettuce mosaic virus (LMV-E) was engineered to express the jellyfish green fluorescent protein (GFP) or beta-glucuronidase (GUS) fused to the helper-component proteinase (HC-Pro) to study LMV invasion and spread in susceptible and resistant lettuce cultivars. Virus accumulation and movement were monitored by either histochemical GUS assays or detection of GFP fluorescence under UV light. The GFP- and GUS-tagged viruses spread systemically in the susceptible lettuce cultivars Trocadero and Vanguard, where they induced attenuated symptoms, compared with the wild-type virus. Accumulation of the GFP-tagged virus was reduced but less affected than in the case of the GUS-tagged virus. Systemic movement of both recombinant viruses was very severely affected in Vanguard 75, a lettuce cultivar nearly isogenic to Vanguard but carrying the resistance gene mo1 (2). Accumulation of the recombinant viruses in systemically infected leaves was either undetectable (GUS-tag) or erratic, strongly delayed, and inhibited by as much as 90% (GFP-tag). As a consequence, and contrary to the parental virus, the recombinant viruses were not able to overcome the protection afforded by the mo1(2) gene. Taken together, these results indicate that GUS or GFP tagging of the HC-Pro of LMV has significant negative effects on the biology of the virus, abolishing its resistance-breaking properties and reducing its pathogenicity in susceptible cultivars.

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